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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/729,069	12/04/2003	Carsten Muenk	532792000100	9175

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BIOTECHNOLOGY LAW GROUP
C/O PORTFOLIOIP
PO BOX 52050
MINNEAPOLIS, MN 55402

EXAMINER	
HUMPHREY, LOUISE WANG ZHIYING	
ART UNIT	**PAPER NUMBER**
1648	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/02/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/729,069	MUENK ET AL.	
	Examiner	Art Unit	
	Louise Humphrey, Ph.D.	1648	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *33-51* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *33-51* is/are rejected.

7)☒ Claim(s) *36 and 38* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 12 January 2007 has been entered.

DETAILED ACTION

This Office Action is in response to the amendment filed 12 January 2007. Claims 1-32 have been cancelled. New claims 33-51 are added and pending.

Claim Objections

Claims 36 and 38 are objected to because of the following informalities: the name of a protein should begin with a capitalized letter, for example, Rev. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Response to Amendment

The rejection of claims 1, 2, 4, 5, 9-14, 22, 23, and 25-32 under 35 U.S.C. §103 (a) as being obvious over Bieniasz *et al.* (1997) in view of Mohler *et al.* (1996) **is withdrawn** in view of the amendment adding the limitation that the first cell is a HeLa cell and the second cell is a 297T cell, or the first cell is a 293T cell and the second cell is a HeLa cell.

The rejection of claims 1, 2, 4, 5, 9-14, 22, 23, and 25-32 under 35 U.S.C. §103 (a) as being obvious over Moir *et al.* (1996) in view of Mohler *et al.* (1996) **is withdrawn** in view of the amendment adding the limitation that the first cell is a HeLa cell and the second cell is a 297T cell, or the first cell is a 293T cell and the second cell is a HeLa cell.

The rejection of claims 1, 2, 4-6, 9-14, and 21-32 under 35 U.S.C. §103 (a) as being obvious over Moir *et al.* (1996) in view of Moosmann *et al.* (1996) **is withdrawn** in view of the amendment adding the limitation that the first cell is a HeLa cell and the second cell is a 297T cell, or the first cell is a 293T cell and the second cell is a HeLa cell.

New Rejection Necessitated by Amendment

Claims 33-35, 37, and 39-51 are rejected under 35 U.S.C. §103(a) as being unpatentable over Doranz *et al.* (1997) in view of Moosmann *et al.* (1996).

The instant claims are drawn to a method for detecting the presence or absence of cell fusion, which comprises:

(1) contacting a system comprising a first cell with a second cell, wherein:

(a) the first cell comprises a first reporter molecule fragment and a viral envelope protein;

(b) the second cell comprises a second reporter molecule fragment and a viral envelope protein receptor capable of binding to the viral envelope protein of the first cell;

(c) the first cell is a HeLa cell and the second cell is a 293T cell, or the first cell is a 293T cell and the second cell is a HeLa cell;

(d) the first reporter molecule fragment and the second reporter molecule fragment combine to form a functional reporter molecule upon fusion of the first cell with the second cell; and

(2) detecting the presence or absence of a signal produced by the functional reporter molecule, whereby the presence of cell fusion is detected by the presence of a signal and the absence of cell fusion is detected by the absence of a signal.

Doranz *et al.* describe a cell-cell fusion assay that depends only on Env-mediated membrane fusion for signal activity to test the effectiveness of a small molecule inhibitor. The assay system comprises two different cell types: (1) effector 293T cells expressing HIV-1 Env and T7 RNA polymerase; and (2) target PA317-T4 cells expressing human CD4, co-receptor CCR5 or CXCR4, and luciferase reporter under the control of a T7 promoter. See p. 1397, right column, 1st full ¶.

Doranz *et al.* do not disclose the alpha complementation of the alpha and omega fragments of ß-galactosidase (ß-Gal).

Moosmann *et al.* describe the alpha complementation of ß-Gal in mammalian cells, specifically, HeLa cells, and disclose that the optimum length of the alpha complementing peptide is about 85 amino acids. Moosmann *et al.* further disclose one alpha peptide spanning from amino acid 1 to amino acid 85 and an omega complementing peptide lacking a region spanning amino acid 9 to amino acid 37 (Figure 1). Moosmann *et al.* explicitly suggest this approach for easy monitoring of various fusion proteins in eukaryotic systems (last paragraph).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the cell fusion assay system of Doranz *et al.* such that the reporter gene is split into two fragments of ß-Gal respectively expressed by a target HeLa cell and an effector 293T cell rather than expressing the full length luciferase in the effector 293T cell. One having ordinary skill in the art would have been motivated to do this so that the complementation of the reporter gene does not occur between adjacent single-transduced cells, indicating that cell fusion is a prerequisite for the formation of the complemented enzyme. In other words, this modification of the cell fusion assay reduces false positive signals and increases the accuracy of the method. There would have been a reasonable expectation of success, given that the alpha complementation has been widely exploited for studies in prokaryotes and that co-expression of alpha and omega peptides resuscitates enzymatic ß-Gal activity that is absent in the single components, as taught by Moosmann *et al.* Thus, the invention as a whole was *prima facie* obvious.

Claims 36 and 38 are rejected under 35 U.S.C. §103(a) as being unpatentable over Doranz *et al.* (1997) in view of Moosmann *et al.* (1996) and Moir *et al.* (1996).

The instant claims are further limited to wherein the first cell further comprises HIV Rev.

The disclosure of Doranz *et al.* and Moosmann *et al.* is set forth above. Neither discloses HIV Rev. However, Moir *et al.* discloses a second cell expressing HIV-1 envelope protein and Rev (page 812, Materials and Methods, left column, last ¶).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the cell fusion assay system of Doranz *et al.* and Moosmann *et al.* such that the effector cell further comprises HIV Rev. One having ordinary skill in the art would have been motivated to do this because the HIV-1 regulatory protein Rev allows efficient expression of the *env* genes, as expressly suggested by Moir *et al.* Thus, the invention as a whole was *prima facie* obvious.

Contact Information

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Louise Humphrey, Ph.D. whose telephone number is 571-272-5543. The examiner can normally be reached on Mon-Fri, 9:30 am - 5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bruce Campell, can be reached at 571-272-0974. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Louise Humphrey, Ph.D.
Assistant Examiner
30 March 2007

BRUCE R. CAMPELL, PH.D
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1600